User Guide

Loop Diagnostic Tool AS-2000
Interactive Fire Detection Systems

AUTRONICA

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1. Introduction

1.1 About the Handbook

This handbook is intended to provide all necessary information for the operation of the Loop Diagnostic Tool, AS-2000 used for interactive fire detection systems (AutroSafe and Autroprime).

1.2 The Reader

The handbook is intended to be used by Autronica Fire and Security service and technical personnel who are responsible for the installation and verification of detection loops.

1.3 Reference Documentation

Reference documentation comprises the technical marketing documentation for interactive fire detection systems (AutroSafe and Autroprime).

2. General Description

AS-2000 is a PC-based installation/service and marketing tool, running under Windows 95/NT/XP. AS-2000 includes the following main features:

- Graphical TOPOLOGY view of all loop units in one loop. Presents loop with branch off (1 level), loop break position, loop short-circuit postion, and individual graphical symbols for all loop units.
- Graphical view of SMV-curves of 4 selectable detectors on a loop.
- Graphical view of SMV-bar graphs for all detectors on a loop, giving actual, minimum and maximum SMV.
- Measuring facilities for finding a loops total resistance, current consumption and voltage drop.
- Possibility to find breaks in loop wire, both in positive and negative wire.
- LED test and SV test.

AS-2000 can be run when connected directly to an AutroSafe operating panel, or standalone, connected to the loop (AutroSafe or Autroprime) by means of an external interface unit, WAS-2000.

3. Setting up the System

3.1 Minimum PC-requirements

- Intel 486 DX 100MHz or higher, when not running SMVCurves facility
- Intel Pentium 133Mhz or higher, running all facilities available
- Windows 95 or Windows NT
- 32Mb of RAM is recommended
- Monitor with resolution of 1024 x 768 HiColor (16 bit), is recommended
- Mouse or other pointing device

3.2 Installing the Software

The AS-2000 software consists of only one single file:
AS-2000 (ver. x).exe

- Copy this file to any folder/directory you want.
- Create a “shortcut” to this file by dragging the file from windows explorer to your desktop. An icon with the Autronica logo (will appear on your desktop if success.
- Make sure your computer monitor is setup with a resolution of 1024x768 HiColor (16 bit).

- To start AS-2000, double-click the Autronica icon.

3.3 Installing the Hardware

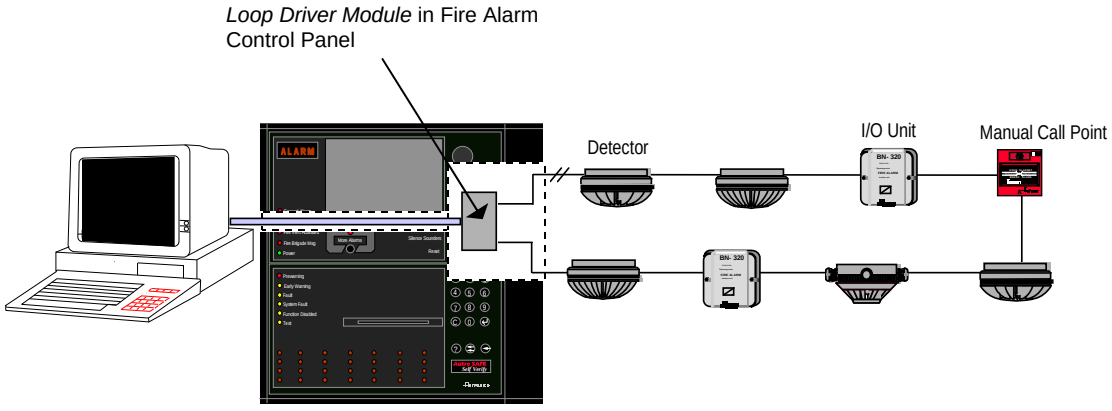
3.3.1 Overview

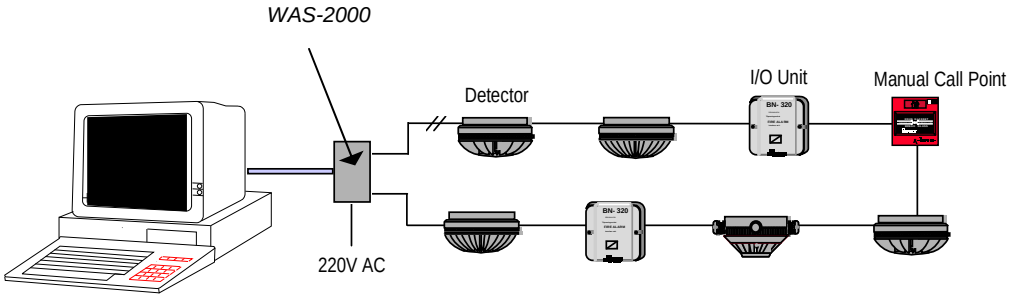
AS-2000 can be run when connected to an AutroSafe operating panel (Fire Alarm Control Panel), or standalone connected to the loop (AutroSafe or Autroprime) with an external interface unit.

One of the serial ports on the computer must be connected to the *Communication Module* in the operating panel or to an external interface unit (both alternatives are shown below).

The external *Interface Unit WAS-2000* consists of 1 Power Module BSS-310, 1 Communication Module BSL-310, and 1-7 Loop Driver Modules BSD-310. These modules are always included in an operating panel.

The Loop Driver Module BSD-310 / BSD-311 (one or more) must then be connected to the loop you want to communicate with.





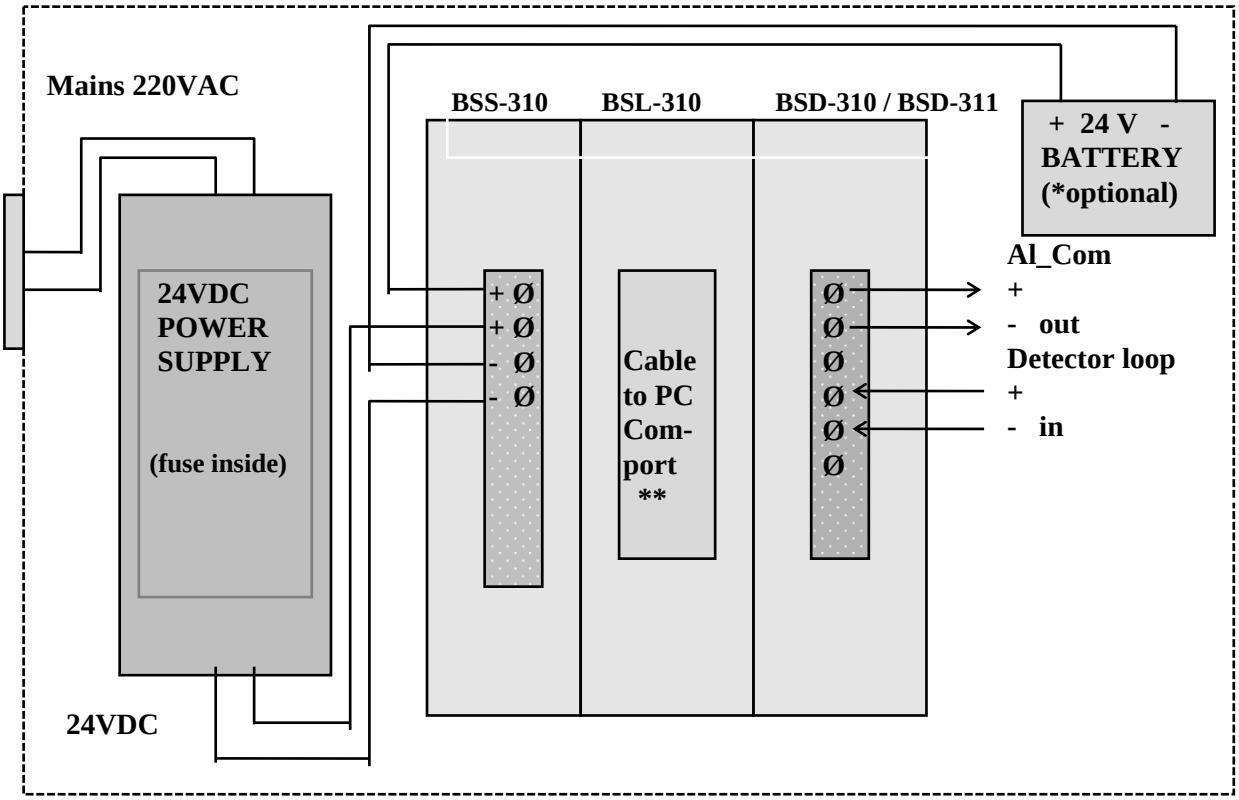
For detailed information on cable connections, consult the following chapters.

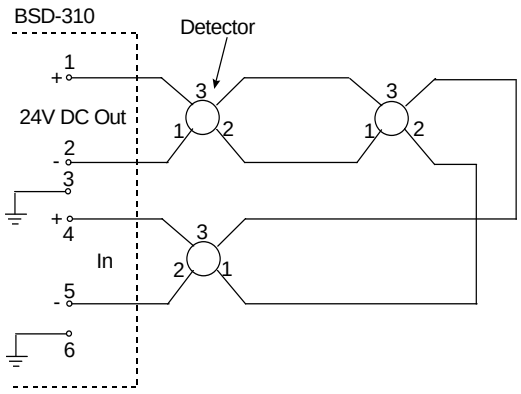
3.3.2 Cable Connections Overview in Interface Unit WAS-2000

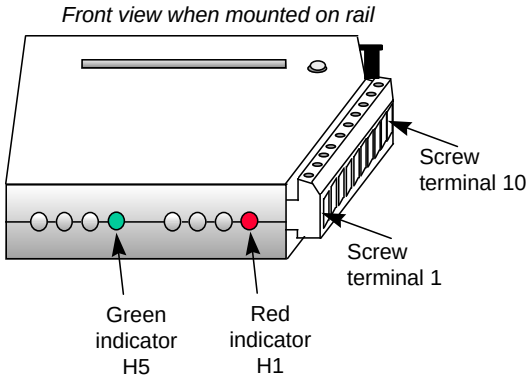
Consult the drawing below, and do the following:

- Connect the 9-pin Desub connector to one of the serial ports (COM1 or COM2) on your computer.
- Connect the WAS-2000 Interface unit to the 220V AC mains outlet.

Note:
If a battery is installed, it must be disconnected when not in use, to avoid discharge.



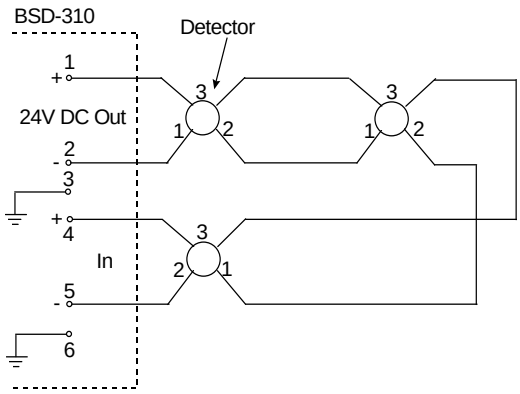


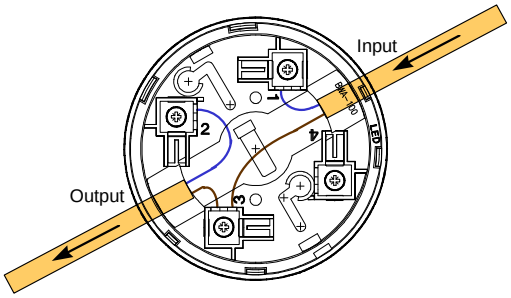


3.3.3 Connecting the Loop Cable to the Loop Driver Module in WAS-2000

Screw Terminal no. on Loop Driver Module BSD-310	Signal
1	OUT +
2	OUT -
3	CHASSIS
4	IN +
5	IN -
6	CHASSIS

The Loop Module BSD-310 / BSD-311 must be connected to the loop you want to communicate with.



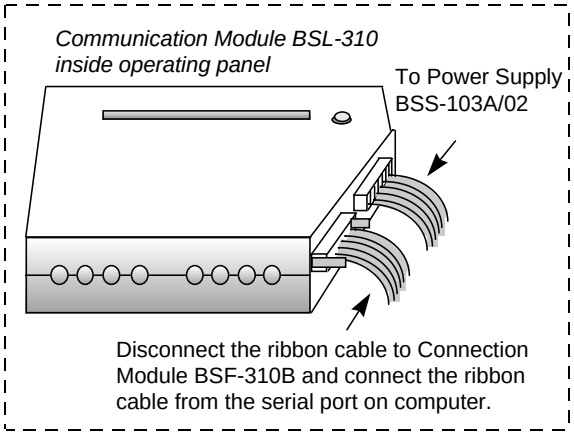


1 - IN
2 - OUT
3 + COMMON
4 - LED

3.3.4 Cable Connections to an AutroSafe Operating Panel

If the AS-2000 is to be connected to the Communication Module BSL-310 inside an operating panel, the ribbon cable that is already connected to the Communication Module BSL-310 must be disconnected (see figure) before the other end of the cable from the computer can be connected.

Note:
To avoid activating the internal buzzer when disconnecting the ribbon cable from the Communication Module BSL-310, turn the power OFF before disconnecting the ribbon cable. When you have connected the external ribbon cable from the computer, turn the power ON.


Communication Module BSL-310
inside operating panel
To Power Supply
BSS-103A/02
Disconnect the ribbon cable to Connection Module BSF-310B and connect the ribbon cable from the serial port on computer.

All power connections to the Power Module BSS-310 are already done. The Loop Driver Modules BSD-310 / BSD-311 are already connected to the loops.

3.4 Starting AS-2000

- Start AS-2000 by double clicking at the shortcut you made in chapter 3.2
- Select an available COM port on the PC.

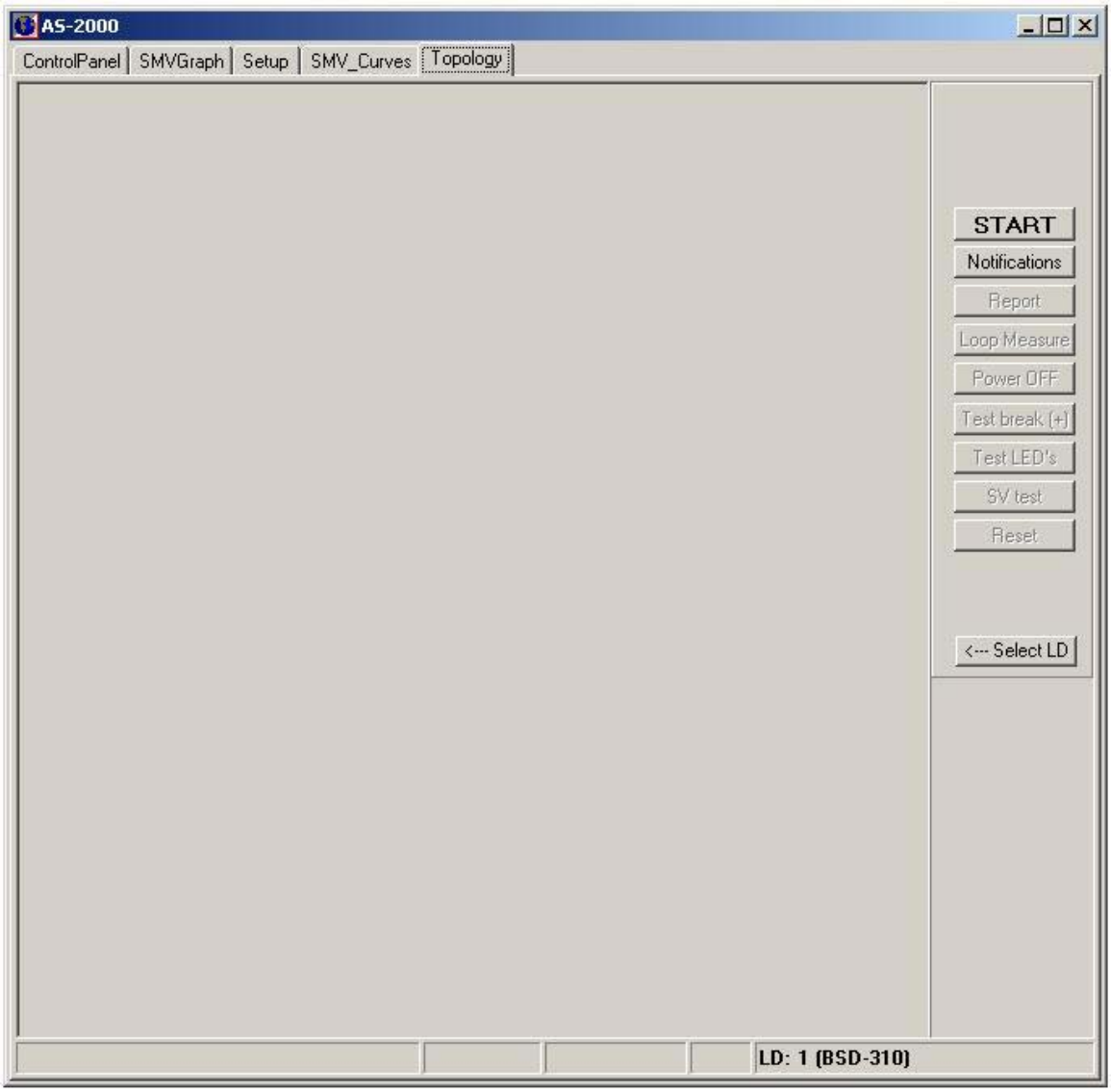
4. Operating the Tool

4.1 Overview

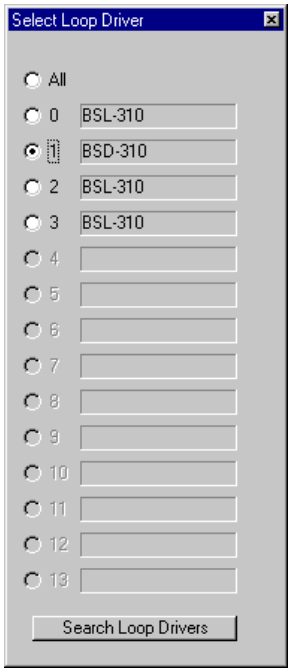
AS-2000 has several windows with three quite different possibilities. Each of these windows are described in the following chapters.

4.2 The ”Topology” Window

The Topology window is the first window most users will access, in order to get a graphical view of the detection loop. Before AS-2000 has presented a loop in the topology window, most of the AS-2000 commands are without meaning.



4.2.1 Select Loop Driver



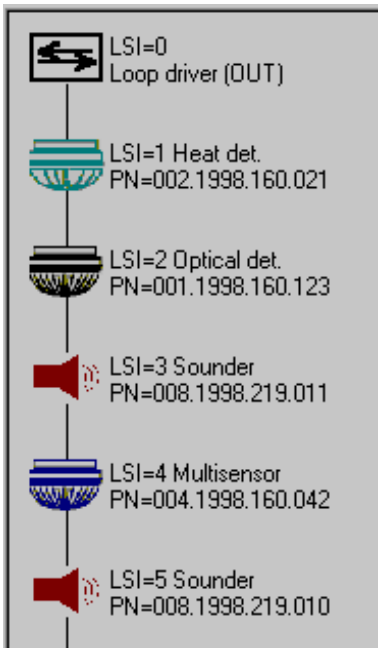
The Select Loop Driver button allows you to select which loop driver module (BSD-310 / BSD-311) or other module (for example, Communication Module BSL-310 or Output Module BSJ-310) to communicate with. By default, loop driver 1 (LD1) is selected, but the user can select any other module.

Pressing the *Search Loop Drivers* button forces AS-2000 to find all loop drivers.

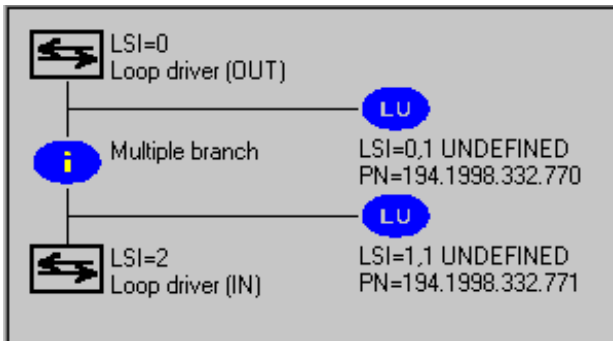
If there are several loop drivers or other modules available, the user must select the one to communicate with.

When pressing the START button (see next chapter) a graphical presentation of the selected module will appear. The examples below show two different presentations.

Example: A Loop Driver BSD-310 has been selected



Example: Communication Module BSL-310 has been selected

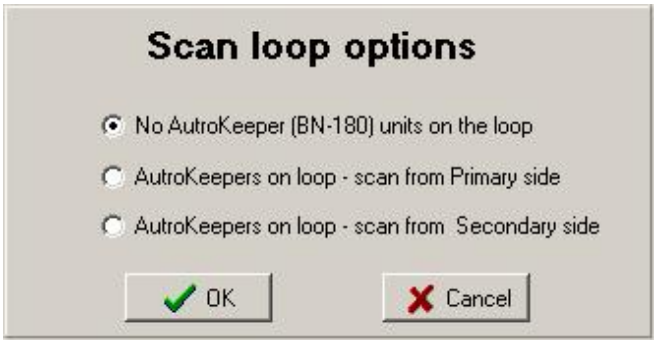


As shown in the example, the AS-2000 is not able to present the topology for the modules BSL/BSB/BSJ-310.

4.2.2 The START Button

Pressing the START button tells AS-2000 to find all points connected to the selected loop driver, and present them graphically in a correct electrical sequence.

Before starting the topology scan, the user must provide information whether the loop contains any Autrokeeper (BN-180) units or not. This is because Autrokeeper units require special handling during topology detection.


Scan loop options
No AutroKeeper (BN-180) units on the loop
AutroKeepers on loop - scan from Primary side
AutroKeepers on loop - scan from Secondary side
OK
Cancel

Points will be presented with unique symbols for each type, and with important information such as Production Number (PN), and the Loop Sequence Index (LSI). In case of illegal topologies, like multiple branch-off and loop break, these will be presented with self-explaining symbols. For a complete list of symbols available, see chapter 5.

While AS-2000 is searching for points across the screen. The flashlight will continue sweeping across the screen until all parameters has been received from all loop units. The START button will change to a STOP button.

Each time AS-2000 finds something irregular, it will beep, and in some cases terminate the topology scan with an error message. When topology is completed, AS-2000 tests for break in the positive wire. If there is a break, the position can be located automatically. This will take less than 20 seconds.

Note: Scanning of a detection loop connected to an AutroKeeper BN-180
If a detection loop is connected to an AutroKeeper BN-180 unit (required for Dual Safety Systems), the user must know if the detection loop belongs to the Primary or Secondary system (defined in the specific configuration).

- If the detection loop in question belongs to the Primary system, select “AutroKeepers on loop – scan from Primary side”.

or;

- If the detection loop in question belongs to the Secondary system, select “AutroKeepers on loop – scan from Secondary side”.

The scanning of loop units is split into 2 logical phases. The first phase is “Scanning topology” which is to find all units physically connected to the detection loop.

The second phase is “retrieving data” from the loop units. Retrieving data is divided in 5 sections, each retrieving a certain type of data. The different phases and the type of data currently retrieved are visible both in the upper right and lower left corner of the AS2000 window.
The animated flashlight is active until all data from the loop units has been received.

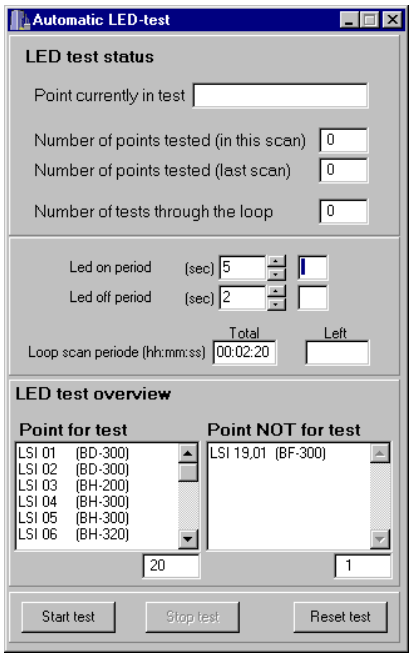
4.2.3 The STOP Button

Pressing the STOP button, forces AS-2000 to stop the topology scan which has been started. When this button is pressed, topology presented on screen may be incorrect. Pressing START again will clear all points and start powering up from the beginning.

The STOP button is available while AS-2000 is searching for loop units. When all units have been detected, the STOP button is temporarily disabled until the mandatory part of reading loop unit parameters has been completed. When all broadcast reading of unit parameters, and the following individual read of point configuration has completed, the STOP button switch back to the START button.

4.2.4 Test LEDs Button

This function will be available when AS-2000 has a loop up and running (Visible in the topology window). When the test is started, AS-2000 will come up with a new window (see the figure below), and all other functions will be blocked until this test is finished.



The test will start with LSI 1 and select points on increased LSI values, branches will be taken before it goes further on the main loop (E.g. 1, 2, 3, 3.1, 3.2, 3.3, 4, 5, …).

The test will turn ON and OFF the LED on one point at the time. During the test, the next point at the loop will be selected, as described above, then all LEDs will turn on and wait for the specified seconds “LED on period”. Then all LEDs will turn off and wait for the specified “LED off period” before the sequence is repeated for the next point. The actual point in test is listed in the “Point currently in test” box.
The Loop scan period gives the total time, and the time left, for a LED test to finish the whole loop.

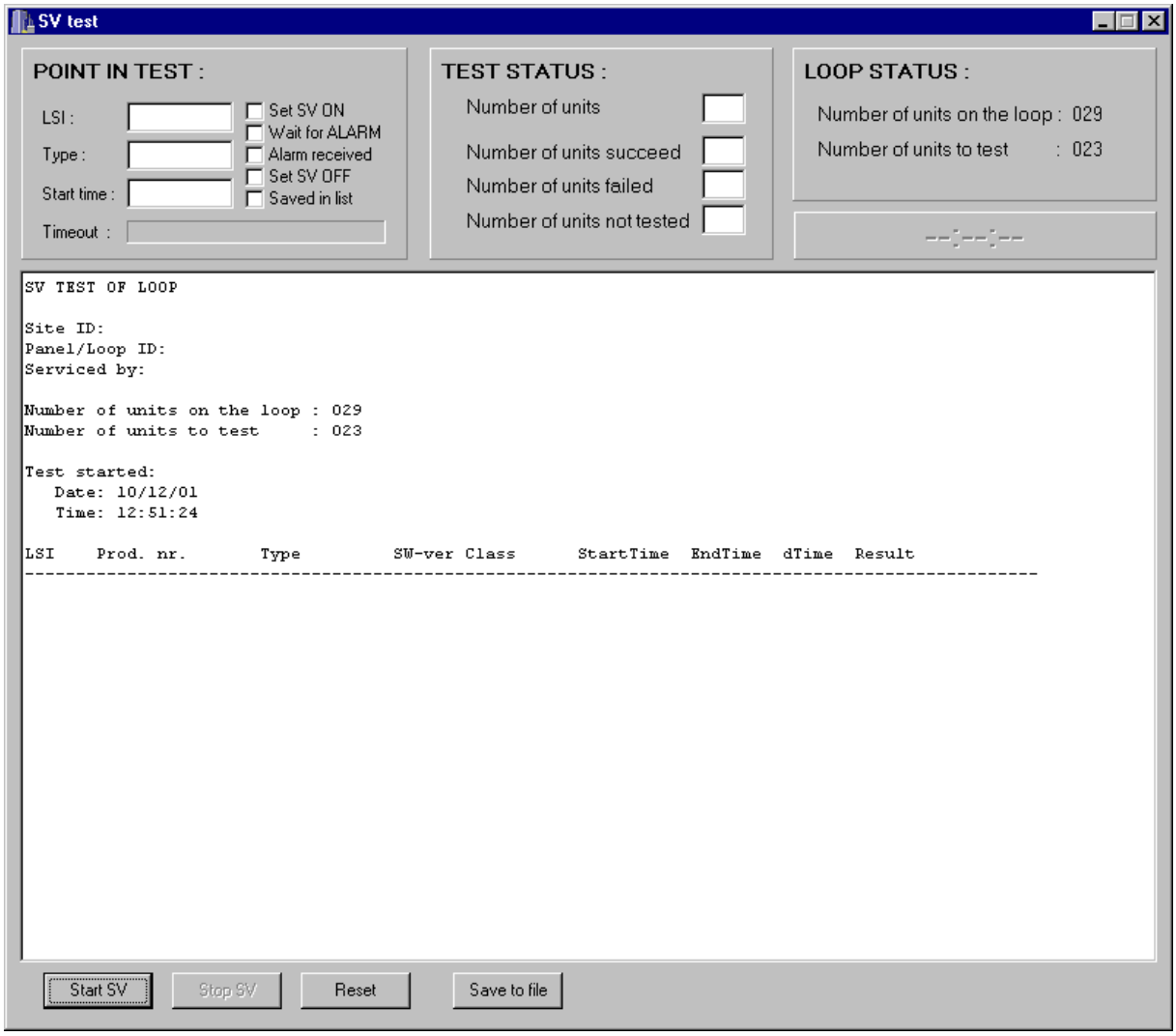
The “LED test overview” lists out the number of points to test and the number of points that does not have any LED to test. The list box identifies the point by LSI and type name.

The LED ON and OFF period can be changed during the test, and the test can be stopped and started again where it stopped. Reset test will make the test scan start over again with the first LSI.

The window has to be closed (x in the upper right) to go back to the main AS-2000 view.

4.2.5 Self-Verify Test

This is a full SV test of all points on the loop. It will list all available points. The point that does not have the SV functionality will be listed as “Not tested”, all other pointsd will be listed with the test result. The points are selected by increasing LSI where branches are finished before it goes further on the main loop.



The test result will be listed with LSI, production number (without Type id number), point type, software version, Class setting, start and end of test, and time used for this test, and at the end the test result. Tested points will have text in red or green colour, depending on the test result. Points not tested will have black text.

POINT IN TEST
This box will list the point in test, the timeout progress bar indicate the timeout period for the actual command.

TEST STATUS
This lists the SV test status so far in the test.

LOOP STATUS
This gives you the information about the loop as it is before the test starts. (Number of units on the loop and number of units that has the SV function implemented).

Reset
This button will reset the test result and get ready for a new test.

Start SV
This will start the SV test. It starts with LSI 0,1 and goes from there.

Stop SV
This button will terminate the SV test. It will finish the point that is started and then terminate.

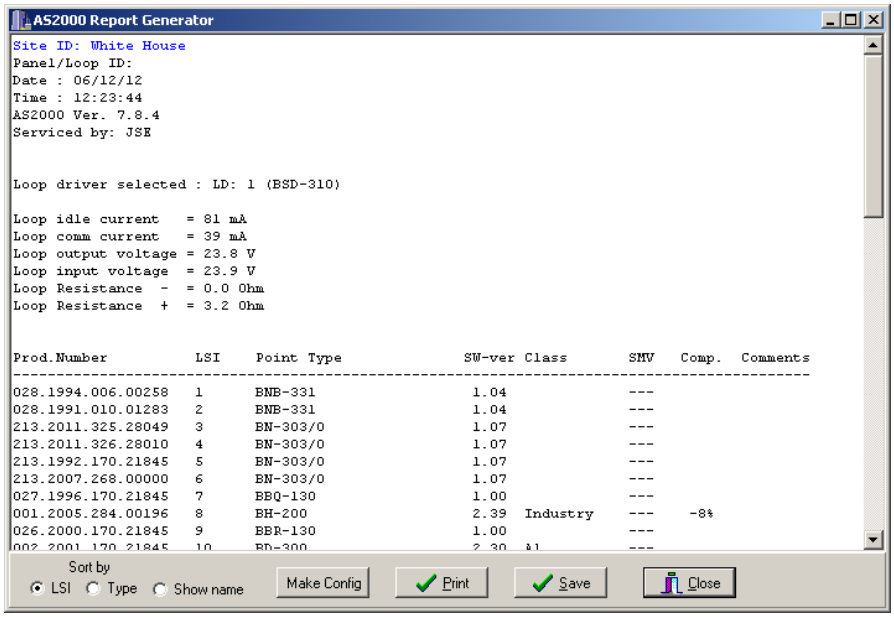
Save to file
This will save the SV test log to file. The format of the report file will be Rich Text (Easy to read with Word and WordPad).

The window has to be closed (x in the upper right) to go back to the main AS-2000 view.

4.2.6 The Report Button

Pressing the Report button allows you to generate a report for the selected loop. The report provides useful information, as shown on the report example below.

Note that when the START (topology scan) button is pressed, the Report button is made inaccessible until all necessary data for generating the report is retrieved from the loop units. When the animated flashlight is switched off, the Report button is enabled.


AS2000 Report Generator
Site ID: White House
Panel/Loop ID:
Date : 06/12/12
Time : 12:23:44
AS2000 Ver. 7.8.4
Serviced by: JSE
Loop driver selected : LD: 1 (BSD-310)
Loop idle current = 81 mA
Loop comm current = 39 mA
Loop output voltage = 23.8 V
Loop input voltage = 23.9 V
Loop Resistance - = 0.0 Ohm
Loop Resistance + = 3.2 Ohm
Prod.Number LSI Point Type SW-ver Class SMV Comp. Comments
028.1994.006.00258 1 BNB-331 1.04 ---
028.1991.010.01283 2 BNB-331 1.04 ---
213.2011.325.28049 3 BN-303/0 1.07 ---
213.2011.326.28010 4 BN-303/0 1.07 ---
213.1992.170.21845 5 BN-303/0 1.07 ---
213.2007.268.00000 6 BN-303/0 1.07 ---
027.1996.170.21845 7 BBQ-130 1.00 ---
001.2005.284.00196 8 BH-200 2.39 Industry --- -8%
026.2000.170.21845 9 BBR-130 1.00 ---
Sort by
LSI
Type
Show name
Make Config
Print
Save
Close

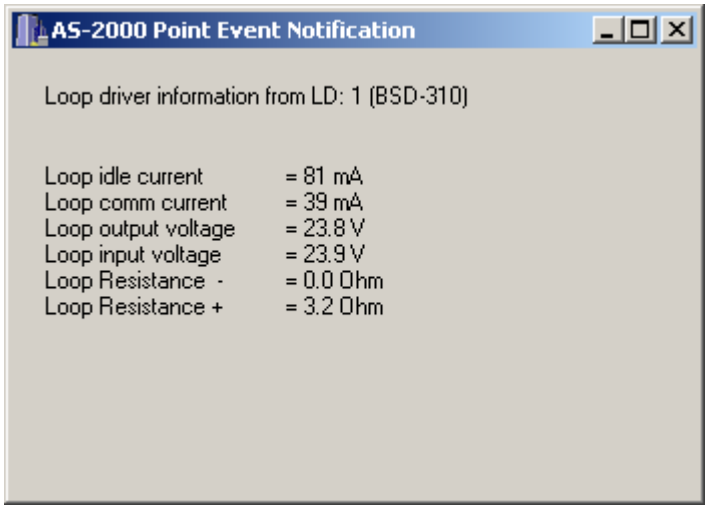
It is possible to sort by Loop Sequence Indexes (LSI) or by type. Show name sorts on LSI, but will show a descriptive name of the units instead of the unit type name.

Clicking the "Make Configuration" button, allows you to generate a *CSU* file, which the AutroSafe Configuration Tool can convert to AutroConfig format. This means you can tell the configuration tool what is on the loop, and let the configuration tool generate the configuration for this loop.

4.2.7 The Loop Measure Button

This command tells the selected loop driver to measure the loop resistance, current consumption and loop voltages. The result will be presented in a dialog box (shown below), and can be used to check the loop condition. Note that current and resistance measuring is not very exact, and should only be used as a guiding result.

If the loop is not closed, the resistance will be presented as an Open Loop.


AS-2000 Point Event Notification
Loop driver information from LD: 1 (BSD-310)
Loop idle current = 81 mA
Loop comm current = 39 mA
Loop output voltage = 23.8 V
Loop input voltage = 23.9 V
Loop Resistance - = 0.0 Ohm
Loop Resistance + = 3.2 Ohm

4.2.8 The Loop Power OFF Button

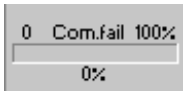
This command turns off the loop power at both sides of the selected loop driver.

4.2.9 The 'Test Break (+)' Button

If the user clicks this button, AS-2000 will perform a test for break in the positive wire. If a break is found, AS-2000 may locate the break, if

desirable. This test is also performed automatically when the START button is clicked.

4.2.10 Comfail Bargraph



The Comfail status field presents the number of ALCOM communication failures per time unit (the sample period is defined in the Setup window). The default sample period is 5 seconds.

4.2.11 Status Bar

A *status bar* at the bottom of the screen gives the following information:

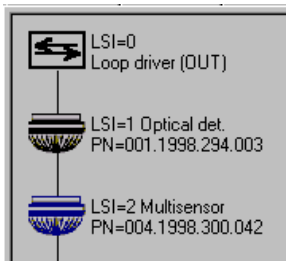
AS-2000 status
Gives the status of AS-2000 at the moment, and tells if input is expected from the user.

Points:
The total number of points is shown.

Earth failure on + and - wire (if present).

States the chosen Loop Driver module (BSD-310) or other module (for example, the Communication Module BSL-310 or Output Module BSJ-310).

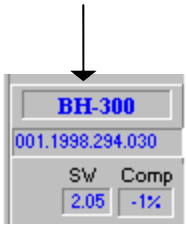
4.2.12 Static and Dynamic Loop Unit Information



When pointing on a loop unit in the topology window, a hand symbol will appear, and *static* information related to this unit will be shown in the field to the right.

If the user left-clicks the mouse pointing on a loop unit, *dynamic* information related to this unit will be shown (i.e. information applicable at the moment, for example, the current temperature).

To achieve this information AS-2000 communicates with the selected point.



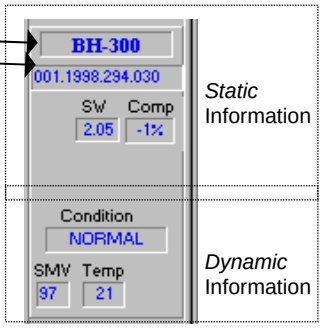
Static Information

Static Information

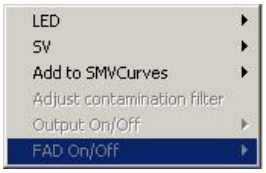
Loop Unit Type
Production Number
SW: Software
Comp: Grade of compensation for pollution (optical detectors, Multisensors)

Dynamic Information

Condition: normal (quiescent), alarm, fault, test, disablement, fault warning (prealarm)
SMV: Standardized Measuring Value
Temp: Temperature



4.2.13 Right Clicking the Mouse



If the user right clicks the mouse pointing at a loop unit, a popup-menu, like the one at the left, appears on the screen. In this menu, the user reaches commands executing at the specific point which is selected. Available commands will vary, depending on the point type. The popup- menu commands are described below.

LED

With this command, you can turn on or off the LED-indicator on a point. Only one LED on the loop will be on at the same time, so when you choose to turn a LED on, AS-2000 automatically turns off all other LED's.

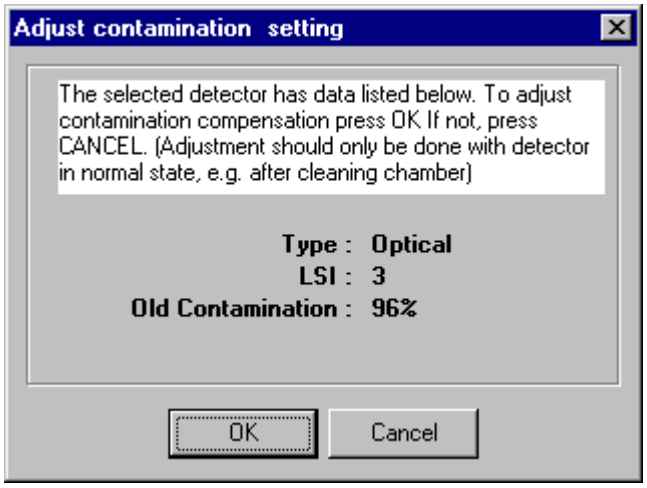
AddtoSMVCurves

With this command the user can set which points to be selected for the SMVCurves window. In the SMVCurves window, up to 4 curves could be presented at the same time, so the user has to select which one of these 4 to associate with the selected point.

Adjust contamination filter

This function is only available in Service mode (Password protected) The function will in service mode be available when you point at an Optical or Multisensor detector.

When the command is selected, AS-2000 starts to communicate with the detector to get the actual Contamination setting/ values.
When this procedure is completed an information window with the result will appear, with the following information (example):


Adjust contamination setting
The selected detector has data listed below. To adjust contamination compensation press OK If not, press CANCEL. (Adjustment should only be done with detector in normal state, e.g. after cleaning chamber)
Type : Optical
LSI : 3
Old Contamination : 96%
OK
Cancel

Pressing OK will start the adjustment of the contamination filter. This is indicated in the status line at the bottom of the window. When the adjustment is completed, a new window will appear, giving the result of the adjustment (example):

The New compensation value set in the detector is given in red text. Do not expect this value to be absolute zero.

This function is to be used when the optical chamber has been cleaned to adjust the contamination filter setting. If not, the detector signal will be too high or low, depending on the type of dust that has been removed. The detector will adjust itself if this function is skipped after cleaning the chamber, but it will take some weeks.
It is important that the chamber is properly dried out, and that the detector does not have any abnormal environmental condition.

Output ON/OFF

The output(s) on the multifunction IO units BN-303, BN-304, FN-305 and BN-308 can be switched ON/OFF.

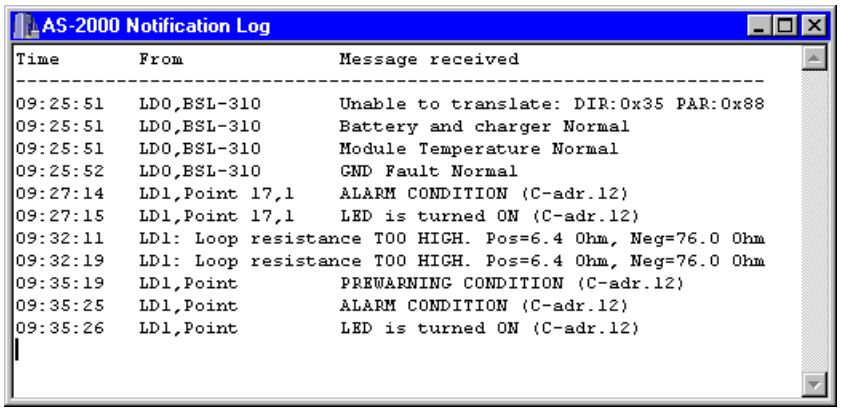
FAD ON/OFF

A FAD can be tested by turning it ON/OFF.

4.2.14 Notifications Button

The AS-2000 Notification Log is a popup window where all important messages / notifications from loop units will appear. The log will contain time stamps, and the log may be copied and pasted into text editors for documentation or storing.

The Notification log (separate window that describes received events) will for this version not be set in front (as the selected window) every time AS-2000 receives an event. So if you close the window it may not appear by it self on the next event. It can then be displayed by pushing the “Notification” button.


AS-2000 Notification Log
Time From Message received
09:25:51 LD0,BSL-310 Unable to translate: DIR:0x35 PAR:0x88
09:25:51 LD0,BSL-310 Battery and charger Normal
09:25:51 LD0,BSL-310 Module Temperature Normal
09:25:52 LD0,BSL-310 GND Fault Normal
09:27:14 LD1,Point 17,1 ALARM CONDITION (C-adr.12)
09:27:15 LD1,Point 17,1 LED is turned ON (C-adr.12)
09:32:11 LD1: Loop resistance TOO HIGH. Pos=6.4 Ohm, Neg=76.0 Ohm
09:32:19 LD1: Loop resistance TOO HIGH. Pos=6.4 Ohm, Neg=76.0 Ohm
09:35:19 LD1,Point PREWARNING CONDITION (C-adr.12)
09:35:25 LD1,Point ALARM CONDITION (C-adr.12)
09:35:26 LD1,Point LED is turned ON (C-adr.12)

4.3 The SMV_Curves Window

In the SMV_Curves window, the user can watch up to four SMV-curves at one time. The X-axis shows a period of time of 360 seconds (6 minutes), and the Y-axis shows the SMV (Standardized Measuring Value). The limits for Prealarm and Alarm are drawn in yellow color, and are the same for all point types.

As you can se, the background color of the SMV_Curves window goes from green (in the normal operating area) through orange (in the prealarm area), and up to red (in the alarm area). Maximum SMV is 255, minimum is 0.

Four detectors are drawn in green at the bottom of the window. These detectors will change color, depending on which condition they are in:

Condition	Color
Fault	White
Normal	Green
Prealarm	Orange
Alarm	Red

There are two steps that has to be done to be able to watch a point's SMV-curve.

1. Select which point to watch.
2. Enable drawing of that specific point.

These two steps are explained in detail in the following chapters.

4.3.1 Selecting a Point to Watch in SMV_Curves

There are two different ways to select a point.

The easiest and most common used, is to enter the topology window, and right click at the point you want to select. In the Popup menu that appears, select *AddtoSMVCurves* (see chapter 4.2.13), and choose one detector curve to assign the point to.

Another way to select a point is to double click at one of the four detector symbols in the SMV_Curves window. You are then asked to tell the C-address of the point, which is usually unknown low-level information used internally by the system. But, in cases where a point gives some kind of information that results in a message on the screen, the C-address is given in this message as a supplement to the LSI. Refer to *Static Loop Unit Information*, 4.2.10.

4.3.2 Enabling / Disabling Drawing of a Specific Curve

To be able to select which of the selected points to watch at a time, each detector curve can be enabled or disabled individually. This is done by checking or unchecking the checkbox next to the detector-curve symbol you want to enable/disable.

4.3.3 Enabling / Disabling SMV_Curves Function

SMV_Curves is a function that takes a lot of resources of Windows95. In some cases, other applications may slow down, and Windows95 will have a fairly slow response to your input. Because of this, you are given the choice whether to update the enabled curves, or not. If the checkbox is checked, curves will be updated. If the checkbox is unchecked, the system is operating quicker, but curves are not being updated, and all SMV data stored will be lost.

4.4 The SMVGraph Window

In the SMVGraph window, the user can watch instant SMV bar graphs for all points on the loop. The X-axis shows the LSI (Loop Sequence Indexes) if topology is presented in the topology screen. If LSI is unknown, the point will be labeled as a question mark.

The individual bar graphs will be updated every time AS-2000 receives a new SMV from a point. It is important to notice that AS-2000 never asks for a SMV, so if a point has disabled “SMV-transition” or set “SMV-transition window” to high, the bar graph for this point may never be updated.

Only 20 points (graphs) can be shown on the screen at the same time. To watch other points, right click the mouse in the graph area, while dragging left or right.

4.4.1 SMVGraph Selector

With this selector, you can switch between showing actual (instant) values, minimum or maximum values. Selection is done by clicking the radio-button next to the mode you want to watch. Minimum values are calculated from the moment AS-2000 was started, or since the last ”Reset Min/Max “or “Reset all”.

4.4.2 Update

The Update command updates all bargraphs by reading fresh values from all points.

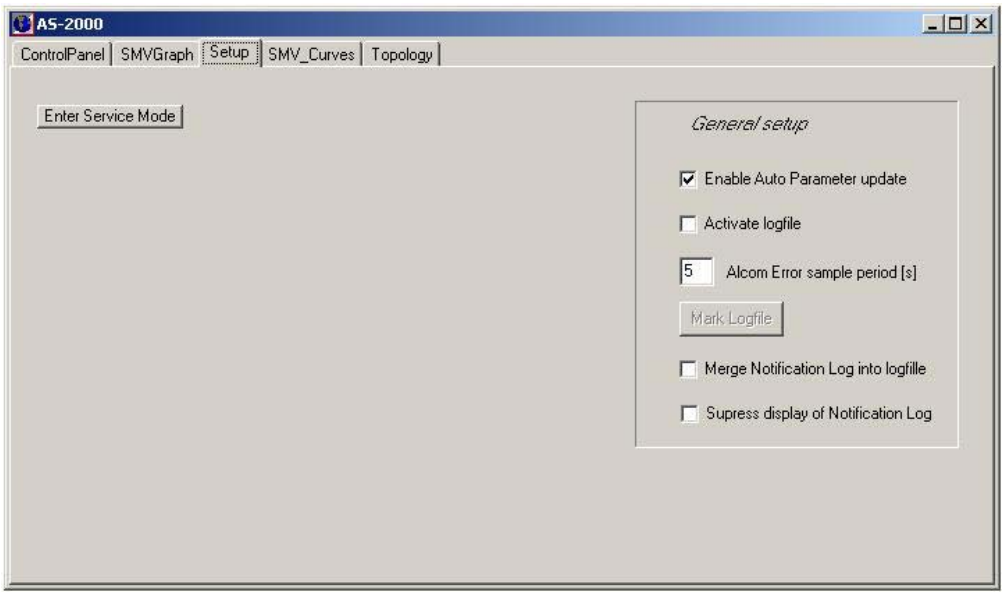
4.4.3 Function Reset Min / Max

This function resets all stored minimum and maximum values.

4.4.4 Function Reset All

This function resets minimum, maximum and actual values.

4.5 The Setup Window

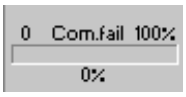


Enter service Mode.
Clicking this button will give you a password dialog box and with the correct password you will be given access to more advanced function (Contamination adjustment and configuration).

Enable Auto Parameter Update:
Toggle function; when ticking off this selection (default enabled), the program will continuously update the data which is generated in the report for the selected loop (The report is generated when pressing the Report button).

Logfile Active:
Toggle function; when ticking of this selection, *all* events will be recorded and placed in the log file.

Alcom Error Sample Period(s):
Here you can state the loop error sample period (default 5 seconds) which is shown in the Comfail status field. The status field presents the number of ALCOM communication failures per time unit.

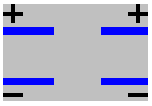
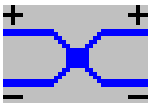


Merge Notification Log into logfile:
The content of the Notification log will be merged into the log file (which was specified when "Activate logfile" was selected').

Supress display of notification Log:
Toggels ON/OFF display of the AS-2000 Notification Log.

5. List of Symbols

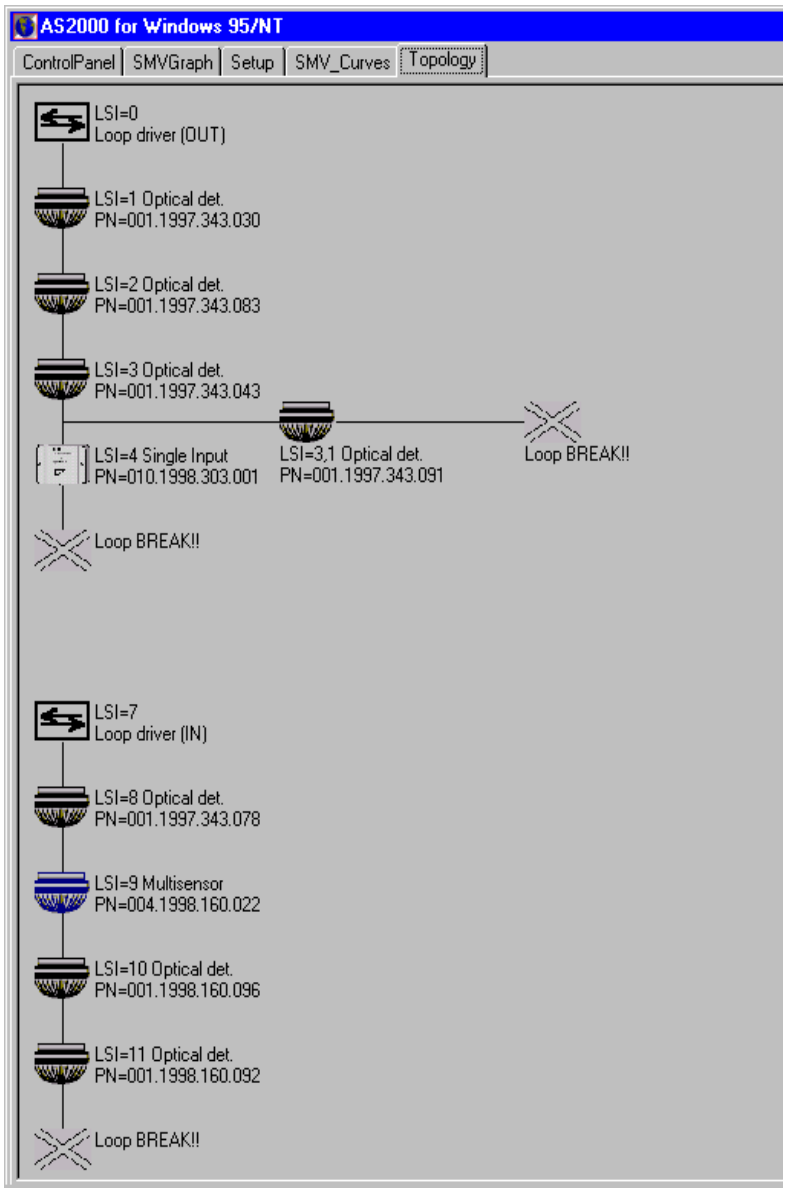
List of all known symbols presented in topology window

	Loop driver (P0)
	Heat detector (BD-200/300/500)
	Optical smoke detector (BH-200/300/500)
	Multisensor (smoke&heat) detector (BH-220/320/520)
	Manual callpoint (BF-200/300/500)
	Addressable sounder (BBR-200, BBR-110)
	Input / Output unit (BN-300,BN-310,BN-320,BN-201, BN-303, BN-304, BN-305, BN-307, BN-308)
	Topology ERROR Probably caused by multiple branch-off, which is illegal. By double-clicking this symbol, a list of the points causing the branch will appear.
	*Loop Break* Indicates a break in the loop wire at indicated position
	*Loop Short-circuit* Indicates a short-circuit on the loop wire.
	Loop Communication Error Indicates a communication error.
	Point Flame Detector BG-201

6. Examples of Special Topologies

6.1 Example 1: Break in Loop Wiring

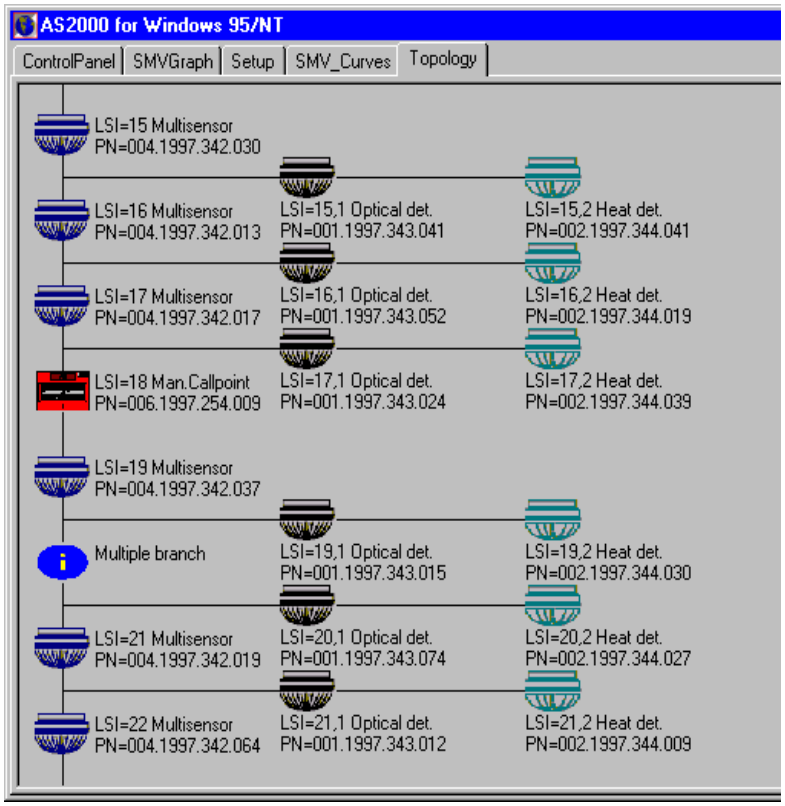
In this example, AS-2000 couldn't find the 'IN' side of the Loop driver, when powering up from the 'OUT' side. Since AS-2000 can't know which of point LSI-4 or LSI-3.1 is the main loop, and which is the branch, AS-2000 presents a break symbol after both. AS-2000 will then power up the loop from the 'IN' side, and find the points on the other side of the break. Note that if there is more than one break in the main loop, there may be several points missing in the loop topology presentation.



6.2 Ex. 2: Multiple Branch-off (Star-connection)

In this example, AS-2000 has given a warning between LSI 19 and 21. This is to indicate that when closing LSI 19's switch, more than 2 new points where powered up. AS-2000 cannot present more than 3 points in a star-connection, and since more than 1 branch-off is an illegal topology, this warning is given.

So in this case, LSI-21, LSI-19.1 and LSI-20.1 are connected to the same point, LSI-19. A possible solution to this problem, would be to connect branch 19.1 to 19.2 between the manual callpoint (LSI18) and the Multisensor (LS19).



Note that AS-2000 cannot present more than 3 points in a star-connection. If there were more than LSI-21, LSI-19.1 and LSI-20 connected to LSI-19, these additional would not be presented in the topology window.

6.3 Ex. 3: Inadequate Interpretation of Loop Topology

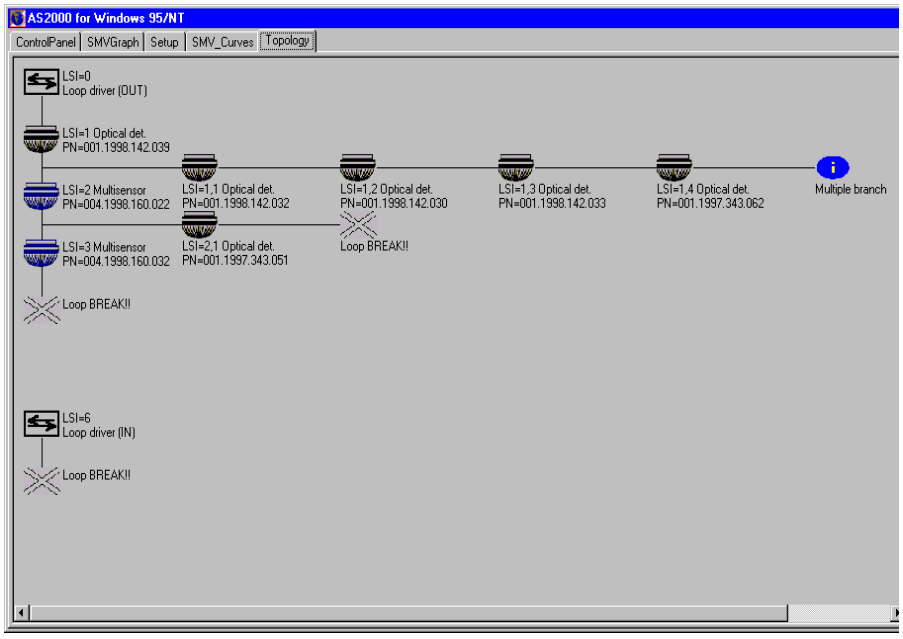
In certain situations, AS-2000 may not give a totally correct presentation of the loop topology. Several factors may affect the interpretation of the loop topology, for example, whether a point belongs to the main loop or a branch-off, which point is registered first during power up, if there is an illegal branch-off, etc.

In this example, AS-2000 informs you that there is one multiple branch-off, and that there is a break in the loop wire. Note that this is actually not the fact, but a result of how the program may interpret the loop in such a situation.

When more than one point powers up at the same time, AS-2000 has to guess which one belongs to the 'main loop', and which one is a branch off.

If AS-2000 comes to a break in the loop wire, it will swap the last assumption (main loop and branch-off), and continue. But if AS-2000 makes a bad guess, and the branch chosen to be the main loop contains a new branch-off (illegal), AS-2000 has problems.

Then the last assumption is verified to be true, and the topology presented will be difficult to understand. The presentation is not wrong, but it may be very inadequate.



In the example above, AS-2000 guesses that LSI-2 is on the main loop, and LSI-1.1 is the branch off. This is actually not true, LSI-1.1 is the main loop.

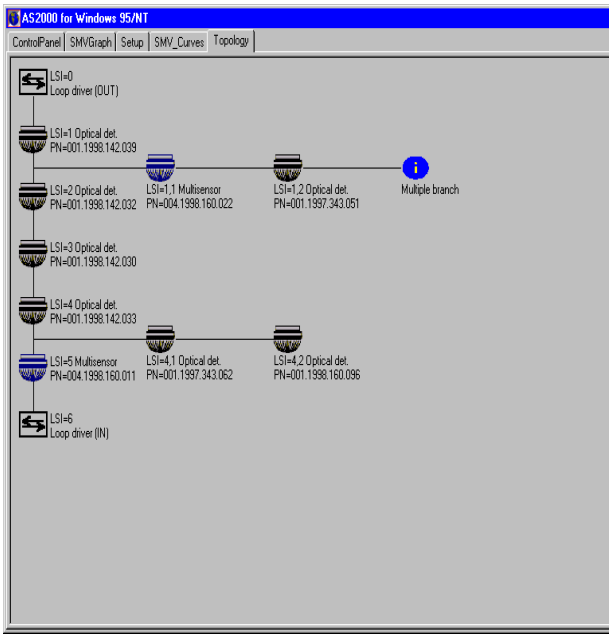
Normally, AS-2000 will find out that it has made a mistake, and switch the last guess made. In this example, however, AS-2000 meets a branch after LSI-2, and *since a branch in a branch-off is illegal*, it assumes that this is still on the main loop, and that the last guess (LSI-2) was correct. But as it can't find more points on what it thinks is the main loop, it assumes the loop has a break at this point.

So because of the illegal branch LSI-2.1, AS-2000 is mislead to believe it is still on the main loop.

As the assumed branch 1.1 is powered up, two points get powered up at the same time at the end of the branch. This is illegal (no branch-off in branch-off's), so AS-2000 has to place a warning symbol there, and stop presenting the rest of the branch.

The two points where actually the last point in what should have been the main loop, and the 'IN' side of the loop driver (closed loop).

Below, the correct topology is presented, as AS-2000 would have presented it if it hadn't guessed wrong in the case of LSI-2, or if the illegal multiple branch-off didn't affect the presentation.



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